

1024-168

Public Reporting and Case Selection for Percutaneous Coronary Interventions: An Analysis From Two Large Multicenter PCI Databases

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Background. Prior studies have suggested that public reporting (PR) of CABG mortality might result in case selection bias and in denial of care to or outmigration of high risk patients. There are no data on the potential effect of PR on case selection for percutaneous coronary interventions (PCI). Therefore, we compared demographic data and indications for PCI from a large multicenter PCI database in Michigan (MI, no PR present) with those from a large multicenter database in New York (NY, PR present).

Methods. Baseline demographic, clinical data and indications for PCI were prospectively collected from 10,702 consecutive PCI in a consortium of 7 hospitals in MI, and 10,847 consecutive PCI in a consortium of 5 hospitals in NY from 1998-1999.

Results. Compared to NY, patients in MI were more likely to undergo PCI for acute myocardial infarction (13.7 vs. 10.2 %, $p < 0.001$) and cardiogenic shock (2.5% vs. 0.3%, $p < 0.001$). The MI cohort was also more likely to undergo emergency PCI, and had a higher prevalence of prior CABG, CHF and PVD (Table).

Conclusion. 1) There are significant differences in case mix between patients undergoing PCI in MI compared to NY. 2) These differences suggest a propensity in NY toward not intervening on higher risk patients. 3) A fear of public reporting and a case selection bias in NY is one plausible but unproven explanation for these differences.

Variable	Michigan	New York	p
Age	62.5±12	63.9±11.7	<0.01
Congestive Heart Failure (CHF)%	12.7	11.5	0.005
Peripheral Vascular Disease (PVD)%	14.9	7.4	<0.001
Prior CABG%	17.1	10.7	<0.001
Creatinine > 2.5 mg/dl %	1.85	1.6	ns
Acute MI %	13.7	10.2	<0.001
Cardiogenic Shock %	2.5	0.3	<0.001
Emergency procedure (%)	15	7.9	<0.001

1024-169

A Simple Quality Improvement Program Improves Cardiovascular Preventive Care Offered by Medical Housestaff at a Large, Urban Hospital Treating a High-Risk Inpatient Population

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BACKGROUND: While cardiovascular disease (CVD) risk factor modification clearly results in lower cardiac morbidity and mortality, great inconsistencies remain in the quality of actual CVD preventive care. Thus, we implemented a simple Quality Improvement Program (QIP) to impact the delivery of preventive CVD care offered by medical housestaff at a large, urban institution.

METHODS: The QIP consisted of a series of housestaff-directed lectures justifying secondary CVD preventive care, a web-based teaching module, pocket guideline cards, discharge checklists, reminder e-mails, patient education handouts, nurse case-manager support, and audit feedback. All patients admitted in the 2-month period before (N=144) and after (N=76) QIP implementation to general medical housestaff services with a new diagnosis or old history of CVD or diabetes were used to assess the efficacy of the QIP. Demographic, clinical, and outcome patient data were gathered by retrospective review of medical record discharge summaries. Compliance with key quality indicators of CVD preventive care was compared between patients in the before- and after-QIP arms.

RESULTS: Compared to the baseline documentation, after-QIP patients were more likely to receive an in-hospital lipid profile assessment (53% vs. 37%, $p < 0.03$), a physical activity level assessment (41% vs. 15%, $p < 0.001$), and a formal discharge exercise prescription (22% vs. 10%, $p = 0.01$). The QIP also increased the likelihood of appropriate patients being discharged on beta-blockers (68% vs. 53%, $p < 0.03$), angiotensin-converting enzyme inhibitors or angiotensin receptor blockers (76% vs. 60%, $p < 0.03$), and statins (55% vs. 40%, $p < 0.04$). No significant changes between the before and after groups occurred with respect to long-term glycemic control assessment, dietary or smoke cessation counseling, or discharge on antiplatelet or hypoglycemic therapy.

CONCLUSIONS: A QIP like the one described here is both easy to implement and an effective means to improve preventive CVD care delivered by medical housestaff at a large, urban teaching hospital. The auditing process of such a program is particularly vital since it identifies areas where improvement is necessary.

1024-170

Association of Medical School Training and Quality of Myocardial Infarction Care

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Background. We sought to determine if treatment of acute myocardial infarction (AMI) is associated with where the physician attended medical school.

Methods. We used the Cooperative Cardiovascular Project Database to identify Medicare beneficiaries admitted with an AMI from 1994 to 1995. Detailed clinical information from chart review were used to determine ideal candidates for aspirin and beta-blocker use. The top 20 U.S. medical schools were determined based on mean MCAT score of students from 1994-2001. The fraction of physicians from a top 20 school for each 3-digit zip code was determined using the AMA Physician Masterfile.

Results. The mean age of 175,109 patients with confirmed AMI was 74+/- 9 years and

47% were female. Use of recommended treatments was higher for patients residing in areas with more physicians that went to highly ranked medical schools (Table). After adjustment for patient characteristics, mean income, education level, hospital teaching status and physician specialty, the quartile with the highest fraction of physicians from top schools (relative to the lowest quartile) had greater use of aspirin (odds ratio 1.3, 1.1-1.4) and beta-blockers (OR 1.1, 1.0-1.3) during hospitalization.

Conclusions. Elderly AMI patients residing in areas with a high proportion of physicians from highly ranked medical schools received care that is more in compliance with guidelines than did patients residing in areas with fewer physicians from highly ranked schools.

AMI Treatment among Ideal Candidates	Percent of Local Physicians from Top 20 Medical Schools			
	>18%	13%-18%	8%-12%	<8%
Aspirin Inpatient (%)	85.3	82.2	83.6	81.6
Aspirin Outpatient (%)	78.1	76.4	76.1	75.3
Beta-Blocker Inpatient (%)	57.2	52.4	55.1	47.4
Beta-Blocker Outpatient (%)	49.1	44.1	47.4	40.9

POSTER SESSION

1048 Outcomes Assessment After Cardiothoracic Surgery

Sunday, March 17, 2002, Noon-2:00 p.m.
Georgia World Congress Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1048-163

Perioperative Creatine Kinase Elevation Is a Strong Predictor of Early and Late Mortality After Coronary Bypass Grafting

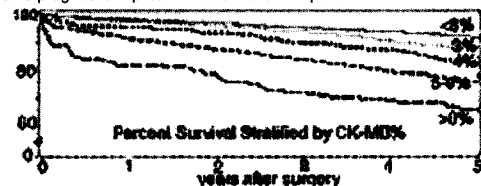
Imad Tlevieh, Khaled M. Ziada, Amjad Almahameed, Ahmed Abdel Latif, David R. Nelson, E Murat Tuzcu, Bruce W. Lytle, Jean-Pierre Yared, Eric J. Topol, *Cleveland Clinic Foundation, Cleveland, Ohio.*

Background: The significance of myocardial creatine kinase (CK-MB) elevation after coronary artery bypass grafting (CABG) remains unclear.

Methods: We studied 3009 patients who underwent isolated CABG at our institution in 1994 and 1995. Clinical and laboratory findings (including CK and CK-MB%) were prospectively collected. Five-year mortality was tracked using the social security death index. The impact of CK-MB on mortality was examined using Cox regression models, after adjusting for the preoperative severity score and cardiopulmonary bypass time. The preoperative severity score is a previously validated index that includes predictors of mortality following CABG.

Results: After correcting for the preoperative severity score and bypass time, CK-MB% was an independent predictor of early and late mortality. Values of 3 and 4% were associated with higher mortality (hazard ratios of 1.35 and 1.72 respectively). When CK-MB exceeded 5 or 9%, hazard ratios were higher (1.84 and 2.55, respectively). Kaplan-Meier survival curves for quintiles of patients are shown.

Conclusions: Perioperative CK-MB elevation was a strong predictor of mortality after CABG. This effect was independent of known predictors of mortality, and consistent from 1st to 5th year. Even minor elevations carried a higher risk of death. Although the mechanism of this association is unclear, CK-MB elevation after surgical revascularization carried the same prognostic implications described with percutaneous interventions.



1048-164

Sex Differences in Quality of Life Six Months After Coronary Artery Bypass Surgery

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Background. Whether coronary artery bypass grafting (CABG) is associated with more unfavorable outcomes in women than in men is unclear, and few studies have examined patients' perspectives.

Methods. We compared cardiac symptoms, quality of life (QOL), depressive symptoms and rehospitalization rates between 294 women and 787 men who underwent first CABG consecutively at Yale-New Haven Hospital between 2/99 and 1/01. QOL was measured by means of the SF-36 Health Survey and 2 summary scales, the Physical (PCS) and Mental (MCS) Component Scales, were computed. Participants were followed for 6 months after hospital discharge. Patients <30 years and those who underwent combined surgeries were excluded.

Results. Women were older than men (70 versus 64 years) and more often had a history of diabetes, hypertension, unstable angina and renal insufficiency, but there were no differences in prior history of MI. At baseline women had lower PCS and MCS scores and more depressive symptoms. They also had higher NYHA angina class and were more likely to have heart failure and undergo emergent or urgent CABG, despite fewer number

of diseased vessels and similar LVEF compared with men. At 6 months, mortality was similar in women and men (2.3% and 2.7%) and QOL, cardiac and depressive symptoms improved from baseline in both men and women. However, after taking into account baseline characteristics (symptom and QOL levels, age, medical history, number of hospitalizations in previous year, severity of CAD, NYHA class, body surface area and urgency of surgery) women showed less improvement in PCS (p=.001), dyspnea (p<.001) and depressive symptoms (p<.05) and had more hospital readmissions (33% versus 22%, p<.001). Women also had a more negative retrospective evaluation of the surgery and the recovery process.

Conclusion. CABG may be less effective in improving QOL in women with coronary heart disease compared with men.

1048-165 Choice of Revascularization Procedure in Diabetics Who Have Had Previous Coronary Surgery

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Background: Though studies indicate that diabetics with multivessel coronary disease may benefit from coronary artery bypass grafting (CABG) compared to percutaneous intervention (PCI), uncertainty regarding choice of revascularization may be greater for diabetics who have had prior CABG. This study evaluates outcomes of diabetics undergoing CABG or PCI after previous CABG.

Methods: Data was obtained over 15 years on diabetics undergoing CABG or PCI after prior CABG. Baseline characteristics were compared between the two groups. In-hospital and 10-year mortality was calculated. Multivariate correlates of long-term mortality were determined.

Results: The two groups were similar in age, sex, years of diabetes, and insulin dependence, but varied in time from first CABG, hypertension, prior myocardial infarction, angina severity, and presence of heart failure. Though in-hospital mortality was greatly higher with redo-CABG (11.2% vs. 1.6%), 10-year mortality rates were similar (67% PCI vs. 75% CABG, p=0.05). Correlates of long-term mortality were older age, hypertension, low ejection fraction, and an interaction between heart failure and PCI. PCI itself was not a long-term correlate of mortality.

	Total (n=1721)	PCI (n=1123)	CABG (n=598)	P value
Age	64±9	64±9	64±9	0.95
Years of Diabetes	10.6±9	10.8±9.2	10.3±8.3	0.52
Insulin Dependent	40%	38%	42%	0.19
Hypertension	72%	69%	76%	0.006
Prior MI	60%	56%	67%	0.0001
Class III-IV Angina	77%	79%	72%	0.0007
Heart Failure	18.2%	15.6%	24.3%	0.0001
Hospital Mortality	4.95%	1.61%	11.2%	<0.0001
10-year Mortality	70%	67%	75%	0.05

Conclusion: Recognizing the potential for selection bias in nonrandomized patients, choice of revascularization procedure did not affect long-term survival. Revascularization decisions in diabetics with prior CABG can be based on clinical and angiographic criteria, as well as patient preference.

1048-166 Predictors of Impaired Health Status Six Months After Coronary Artery Bypass Graft Surgery

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Background: Health Status after coronary artery bypass graft (CABG) is an important outcome. This study aims to identify preoperative determinants of poor health status 6 months post-CABG.

Methods: CABG patients were identified prospectively over one year and enrolled in the study at 14 surgical centers in Washington state (n=1070). Each patient completed a survey preoperatively and at six months postoperatively containing the RAND Short Form-36 (SF-36). The Physical Component Score (PCS) and Mental Component Score (MCS) were used as the main outcome. Multivariate logistic regression models were developed to determine predictors of poor health status, below the median PCS and MCS, six months post-CABG.

Results: 883 (83%) of the patients enrolled completed questionnaires. Non-responders had significantly more comorbidities, more social risk factors, less income, and less education than responders. Predictors of a below median PCS six months post CABG were baseline below median MCS and PCS, baseline unemployment, presence of congestive heart failure, baseline presence of comorbidities, and history of prior catheterization. Predictors of low MCS were below median baseline MCS and low income.

Conclusions: Presence of pre-operative clinical and social risk factors could be used to identify patients at risk for having less than optimal health status six months post-CABG. Identified patients may be candidates for case management, which could ultimately lead to better outcomes.

Multivariate Predictors of Below Median SF-36 Mental and Physical Component Scores

Preoperative Clinical Variable	Odds Ratio for Low PCS (95% CI)	P value	Odds Ratio for Low MCS (95% CI)	P value
MCS baseline				
Quartile 1 (lowest)	3.6 (2.2-6.0)	<.0001	6.3 (4.0-10.0)	<.0001
Quartile 2	2.4 (1.5-3.9)	.0003	3.3 (2.1-5.1)	<.0001
Quartile 3	1.7 (1.1-2.7)	.031	2.6 (1.7-4.0)	<.0001
Quartile 4 (highest) - Reference				
PCS Baseline				
Quartile 1 (lowest)	8.0 (4.6-13.8)	<.0001		
Quartile 2	3.5 (2.1-5.7)	<.0001		
Quartile 3	2.6 (1.6-4.2)	.0002		
Quartile 4 (highest) - Reference				
Income <25k vs >25K	1.1 (0.8-1.7)	.501	1.9 (1.4-2.8)	.0003
Missing income data vs >25K	2.2 (1.1-4.8)	.03	1.3 (0.7-2.3)	.425
Unemployed at Baseline	1.6 (1.1-2.3)	.02		
Congestive Heart Failure	2.2 (1.3-3.9)	.005		
Number of Comorbidities*				
1	0.9 (0.6-1.4)	.707		
2	1.4 (0.9-2.3)	.172		
3	5.3 (2.0-13.9)	.001		
>=4	6.7 (1.2-35.6)	.027		
Number of Lifetime Catheterizations vs none				
Site†		.021		.09

* Comorbidities include: hypertension, COPD, diabetes, cerebrovascular accident, chronic renal insufficiency, and peripheral vascular disease. Each category (1,2,3, >4) is compared to zero comorbidities as a reference. † Site is included to demonstrate its overall effect on the model

1048-167 Low Perceived Social Support Influences Quality of Life of Female Patients Undergoing Coronary Revascularization

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Background: Social isolation has been identified as an important indicator of prognosis after myocardial infarction. Little data exist describing the influence of social support on outcome after revascularization or the differential effect of social support on men and women. We examined the influence of social support and gender on disease specific quality of life in patients undergoing coronary revascularization.

Methods: This study prospectively tracked 446 patients' quality of life (QOL) and perceived social support (PSS) at baseline and at monthly intervals for 6 months following coronary revascularization (n= 243 undergoing PCI and 203 receiving CABG). The Seattle Angina Questionnaire (SAQ) was used to assess disease specific quality of life (QOL). SAQ scores range 0 - 100 where higher scores indicate better functioning. PSS was assessed by the ENRICH Social Support Inventory (ESSI). Higher scores on the ESSI indicate higher social support.

Results: Female patients with low PSS (n= 22) had worse QOL at the time of revascularization (mean SAQ score = 39 +/- 15 vs 49 +/- 22, for 122 women without low PSS, p=0.04), and after 6 months (mean SAQ score 67 +/- 29 vs 80 +/- 20; p= 0.04). In contrast, male patients with low PSS (n= 41) did not have statistically significant different QOL at baseline (51 +/- 22 vs 55 +/- 22 for males without low PSS (n= 261); p= 0.77), or at follow-up (71 +/- 26 vs 82 +/- 18, p= 0.06). Baseline characteristics (age, DM, HTN, EF, smoking, prior MI, prior PTCA) were similar in both groups of males and females except that more female patients with low PSS had had a prior CABG (27% vs 8% without low PSS, p= .04).

Conclusion: Perceived social support influences QOL in female patients with CAD undergoing revascularization. Interventions to improve social support in these patients may help in improving QOL of these patients before and after revascularization.

1048-168 Clinical Outcomes and Costs of Amplatzer Transcatheter Closure as Compared With Surgical Closure of Ostium Secundum Atrial Septal Defects

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Background: Transcatheter implantation of the Amplatzer septal occluder (ASO) is an alternative to conventional surgical closure of isolated secundum atrial septal defects (ASDs). Neither the clinical outcomes nor the costs of these procedures have been extensively compared.

Methods: We performed a retrospective cohort study to evaluate cost-effectiveness in patients with secundum ASDs who underwent closure using either placement of an ASO or surgery between 1998 and 2000. To estimate hospital costs, we multiplied the observed use of resources by TSI unit costs based on available accounting data.

Results: On the basis of trans-thoracic color doppler echocardiography performed at follow-up, the initial procedure resulted in successful closure (complete or any residual